# Weld Analyzer – BMS 210AD

## User Manual V. 1.1

2014

**BAFFCO**

Flat 10, No. 6, Ezatipour Street,
Sattari cross Hakim highways,
1471836837, Tehran, Iran

Telephone: (+9821) 44004100, 44004200

Telefax: (+9821) 44004300

## Contents

1. Special Notes ..... 3
2. Packaging List ..... 4
3. Features and Specifications ..... 5
4. Dimensions ..... 10
5. General Descriptions and Operation ..... 12
6. Quick Start with BMS210AD ..... 14
7. Operation and Setting the Instrument ..... 15
   7.1. Measuring AC Continuous Current ..... 15
   7.2. Measuring AC Pulse (Welding Current) ..... 16
   7.3. Measuring Rectified Current (DC) ..... 18
   7.4. Measuring Electrode Force ..... 19
   7.5. Measuring Continuous Force ..... 22
8. History ..... 22
9. Maintenance ..... 24
   9.1 Force shot down the instrument ..... 24
   9.2 Replacing internal battery ..... 24
10. BMS Utility ..... 25
11. Calibration ..... 26

# 1. Special Notes

**Please avoid following locations when using the instrument:**

**. Location where temperature is higher than 55°C or less than 0°C**

**. Location with humidity over 90%**

**. Location where there is a radio frequency noise source**

**. Location where chemical substances exist.**

**. Location where expected frequently condensation occurs**

**. Dusty location**

**. Location exposed to direct sunlight**

Table 1 Used signs definition

| | |
|---|---|
| | **Risk of death or serious injury** |
| | **Do Not do specified action** |
| | **Dangerous voltage level for human** |

# 2.Packaging List

**. BMS210AD Instrument**

**. Toroid**

**. 9V, 1A Adaptor**

**. BMS Utility Installer CD**

**. USB Cable**

**. Force Probe (Optional)**

**. Instrument Caring Bag**

**. BMS210AD User Manual**

# 3.Features and Specifications

## A) AC Welding Type Current Measurement

**. Real Time Monitoring of Real RMS Current**

**. Three Ranges of Current Measuring:**

**0.5kA to 5kA**

**5kA to 20kA**

**20kA to 100kA**

**. Acceptance of 15 Current Pulsations as One Measuring**

**. Maximum Current Pulse Duration 500 Cycle**

**. Auto Save and Monitoring Details of each Current Pulse Including:**

**I_RMS**

**I_Max.**

**Conduction Angle**

**Cool Time between Two Consecutive Pulse**

**Cycle Number**

**Pulse Number**

**. Show Overall Results of measuring in One Page. After Each Measuring**

**. Archive Up to 1000 Measuring Records Including All Details**

**. History Page to Show Archived Records**

. Setting Page to Set Bellow Parameters

Ignoring Undesired First Cycles Current

Ignoring Undesired Last Cycles Current

Setting Maximum Acceptable Cool Time between Two Pulses

Current Range

Current Frequency

Current Type Selection: ( AC_Welding, AC_Continuous, DC )

## B) AC Continuous Current Measurement

. Real Time Monitoring of Real RMS Current

. Three Ranges of Current Measuring:

0.5kA to 5kA

5kA to 20kA

20kA to 100kA

## C) Rectified Current (DC) Measurement

. Real Time Monitoring of Real RMS Current

. Three Ranges of Current Measuring;

0.5kA to 5kA

5kA to 20kA

20kA to 100kA

. Acceptance of 15 Current Pulsations as a One Measuring

. Maximum Current Pulse Time Duration 4000 ms

**. Auto Save and Monitoring Details of each Current Pulse Including:**

**I_RMS**

**I_Max.**

**Duration**

**Cool Time between Two Consecutive Pulse**

**Pulse Number**

**Duty Cycle**

**. Showing Overall Results of measuring in One Page after Each Measuring**

**. Archiving Up to 1000 Measuring Records Including All Details**

**. History Page to Show Archived Records**

**. Setting Page to Set Bellow Parameters**

**Ignoring Undesired First Time**

**Ignoring Undesired Last Time**

**Setting Maximum Acceptable Cool Time between Two Pulses**

**Current Range**

## D) Electrode Force Measurement

**. Average of Force up to 2000 kgf**

**. Measuring Force Applied Time**

**. Maximum Applied Electrode Force**

**. Showing All Details in One Page**

**. Up to 1000 Auto Saving Measured Force**

. History Page to Show Saved Records with Details

. Setting Page to Set Bellow Parameters

Ignoring Undesired First Cycles Force

Ignoring Undesired Last Cycles Force

Force Type Measuring Selection: (Limited Time, Continuous)

## E) Continuous Force Measurement

. Real Time Monitoring of Average of Force up to 2000 kgf

## F) PC Software Utility

. Archiving All Measured Current and Force Records in PC with Their Details

. Graph Results of Measured Values

. PrintResults of Measured Values with Printing Options

. Clear Internal Memory

## G) General Specifications

. Very Low Power Consumption

. Using Very Fast 32 bit DSP

. Using Mathematical Algorithms to Calculate Results

. Auto Power Off

. Auto LCD Turn off

. Internal Rechargeable Battery

**. 16 Hours Life Internal Battery**

**. Auto Sensor (Current/Force) Detection**

**. Fully User Friendly Operation**

**. USB Port**

**. Light and Compact Casing**

## Accessories

**. Toroidal Current Sensor**

**. Force Sensor (Optional)**

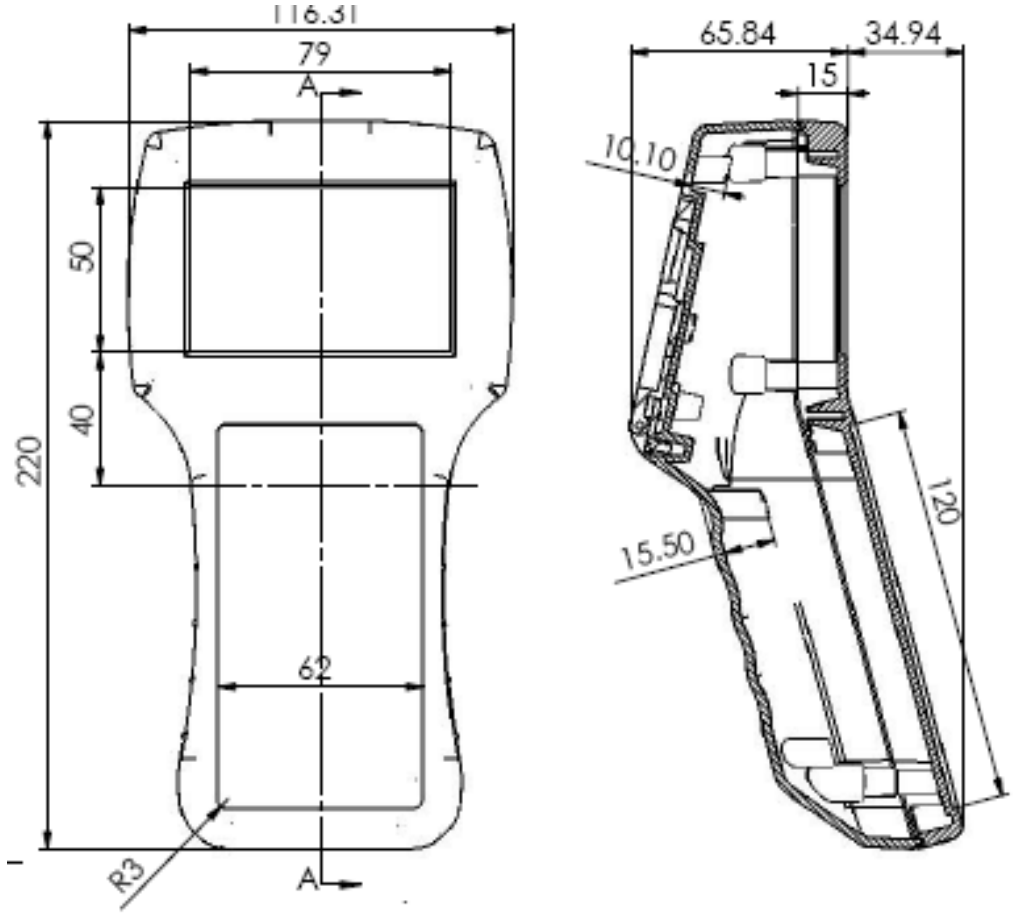
**. Adaptor**

**. Rigid Bag for Carrying Safely Equipment**

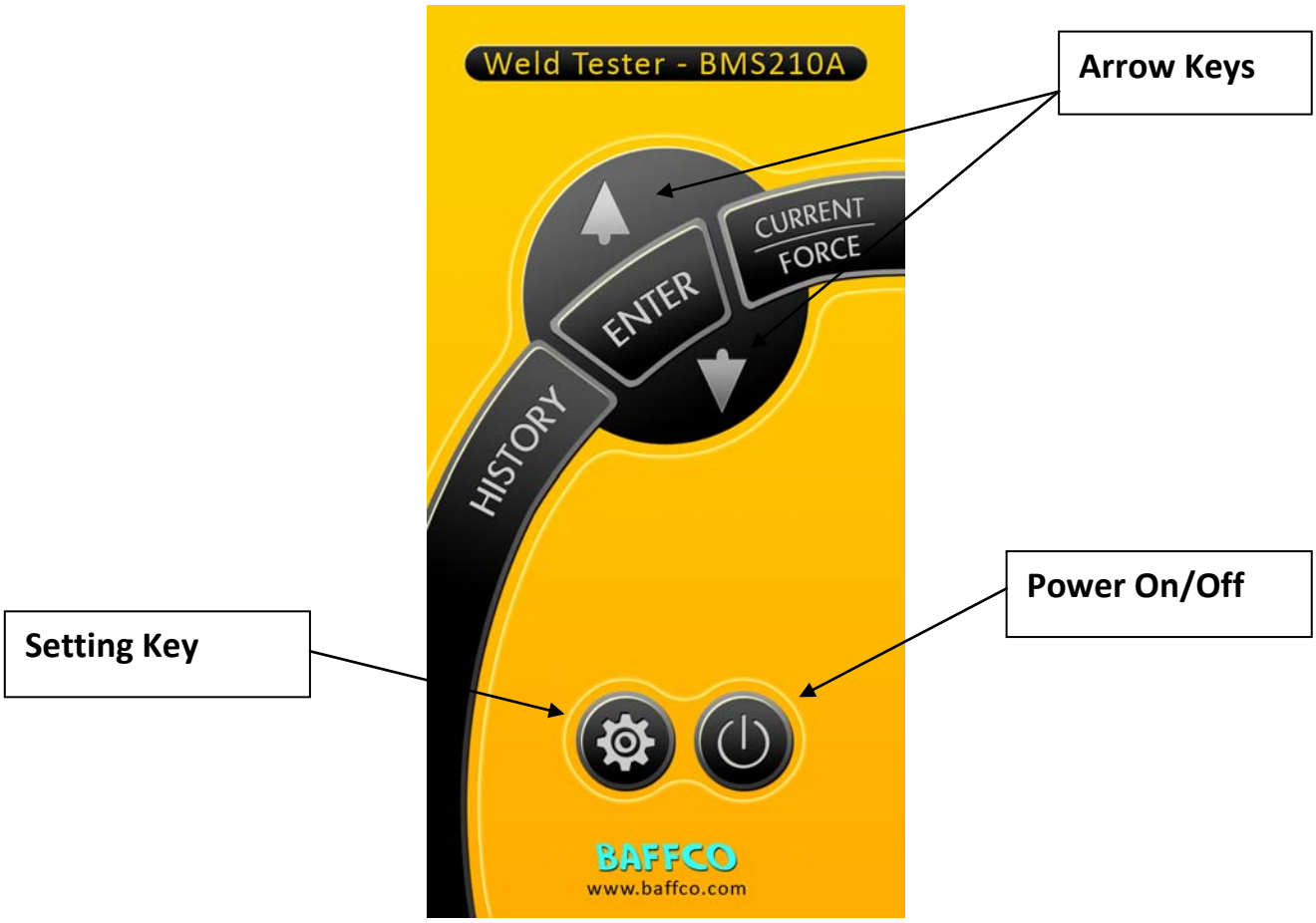
**. USB Cable**

**. Software Utility CD**

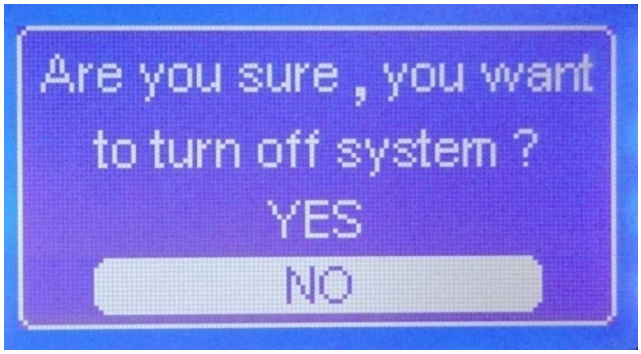
# 4. Dimensions



# 5.General Descriptions and Operation



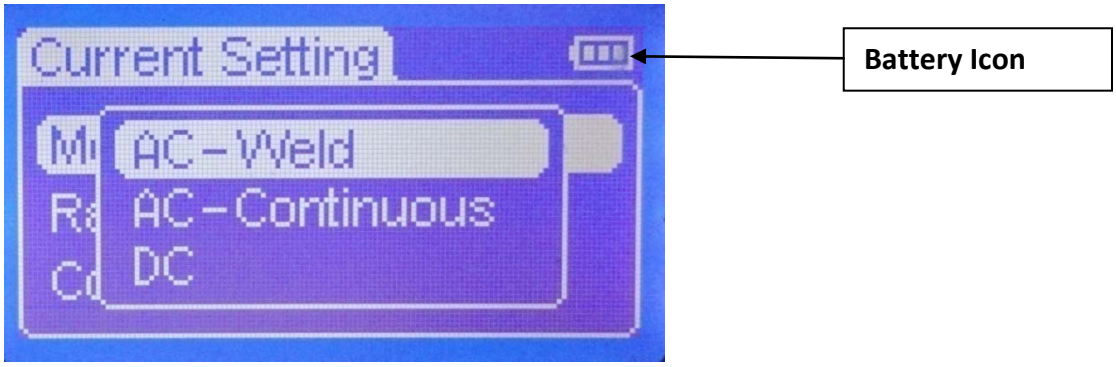

**To Turn instrument on press and hold Power key for a second.To turn instrument off press Power key again, device will ask you about turning off the system, select YES to response the system, then after 4 seconds instrument will be turned off.**



**Before turning off the instrument it shows a page that includes information about serial number, hardware version and software version.**

**If there is no action including measuring or pressing a key for three minutes back light of screen will be turned off, and this situation will remain for seven minutes. The instrument will make a beep sound to inform user that the system will be turned off in a few seconds and after this time it will turn off.**

**There is an icon in the top right corner of the screen which shows battery charge level, if the icon changes every second, it means the adaptor is connected to the instrument and battery is charging.**



# 6. Quick Start with BMS210AD

## A) Current Measuring

***Step1:*** **Put toroid around current conductor (like one arm of welding gun).**

***Step2:*** **Connect toroid connector to the instrument'sinputterminal.**

***Step3:*** **Turn instrument on by pressing power button.**

***Step4:*** **Press Setting button in order to move to current setting page.**

***Step5:*** **Select current type (AC/DC), current range and currentfrequency if AC measuring is selected.**

***Step 6:*** **Press setting button to return to the measuring screen.**

**Now instrument is ready to measure current passes through the conductor.**

## B) Force Measuring

***Step1:*** **Turn the instrument on by pressing the power button.**

***Step2:*** **Connect force sensor connector to the instrument's input terminal.**

***Step3:*** **Press Setting button in order to move to force setting page.**

***Step4:*** **Choose the force measuring type (Continuous/Limited Time).**

***Step 5:*** **Press setting button to return to the measuring screen.**

**Now instrument is ready to measure force.**

***Note: If force or current sensor connected to the instrument, device automatically will change its measuring mode to appropriate sensor and user won't need to select current or force measuring mode.***

***Note: If instrument measuring parameters assigned to desired values once, user won't need to select above parameters before the same measuring routinesafter powering on the instrument works by latest setting.***

# 7.Operation and Setting the Instrument

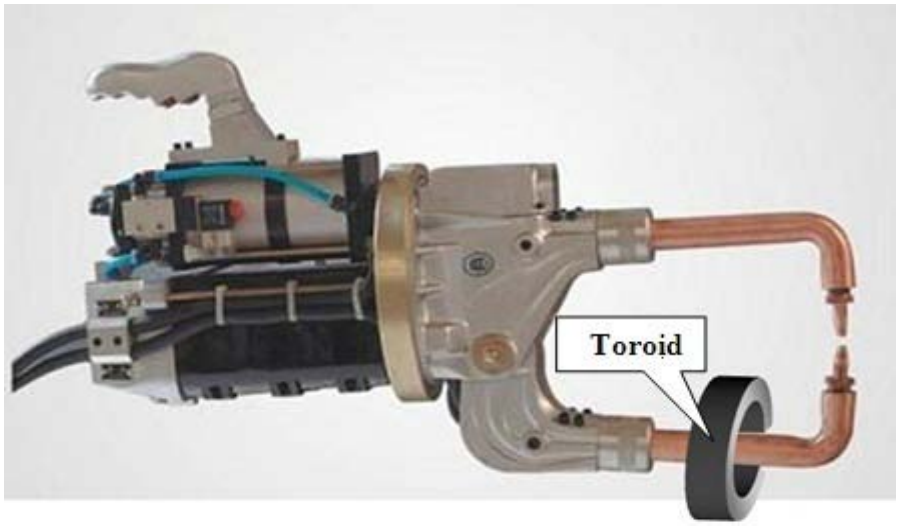
**The instrument measures current as well as force to assist quality control persons in the welding production line or any other placeswhere these type of current or force are involved.**

## 7.1. Measuring AC Continuous Current

**Like any clamp current meter you can use the instrument to measure current. BMS210AD applies the mathematical calculation to find current value. By using this method, current wave form can be any function of time.**

**To set the instrument as an AC continuous measurement,follow these steps:**

1- **Connect toroid to the instrument,**
2- **Put toroid around conductor,**




3- **By pressing the setting bottom go to the setting page**

**Select AC current continuous**

**Select your desired range.**

4- **Press setting bottom to return to measuring screen**
5- **Instrument is ready for measurement. By passing a current through toroid, it measures the current automatically. The device shows real time current amount.**

## 7.2. Measuring AC Pulse (Welding Current)

**If current exists for a very short time and may have several train pulses like the resistance welding current put the instrument in this mode.**

**There are some selections to match the device with current behavior more exactly, you can set maximum no current time (cool time), the range, first cycle to start measuring and last cycle to finish measuring. To learn how to use these abilities,follow these instructions:**

1- **Connect toroid to the instrument,**
2- **Put toroid around conductor.**
3- **By pressing the setting bottom, go to the setting page**
4- **Select AC Welding current**

**5- Select desire range**

**Set Cool Time. This value informs the instrument how long of inexistence of current is allowed. For example if you set cool number to 10, it means if there are two sorts of current pulses with cool cycles of 8 or 9 cycles between them, they are recognized as one measuring and save in the same record.**

**Set Ac first cycle. This parameter value means the device ignores some cycles of current according amount of first cycle. For example if you set this parameter to 4, then first 4 cycles of current will not affect the measuring routines.**

**Set AC Last Cycle. This parameter is used to eliminate undesired current at the end of current wave form.**

**Select Current Frequency. By pressing setting bottom you can go back to measuring page.**

6- **Now the instrument is waiting for a current and will measure it.After measuring, you will see over all measured values on the screen. To see more details press Enter Key and move thorough results by pressing Arrow Keys.**

**The instrument automatically saves any measuring in the internal memory. Maximum record number is 999.**

## 7.3. Measuring Rectified Current (DC)

**If the current is rectified and hasn't zero average, you can measure the current by putting the instrument in DC current mode. In this case, current can be a DC or medium frequency welding current.**

**There are some selection to match the device with current behaviormore exactly. You can set maximum "no-current" time (cool time),measuring range, rise time(time to start measuring) and fall time (time to finish measuring). To learn how to use these abilities follow these instructions:**

1- **Connect toroid to the instrument**
2- **Put toroid around the conductor.**
3- **By pressing the setting bottom you can go to the setting page.**

**Select DC.**

**Select desire rang.**

**Set cool Time, this value informs the instrument how long of inexistence of current is allowed. For example if you set the cool time to 10, it means if there are two following current train by 80 or 90 ms distance, they are recognized as one measuring and will be saved in the same record.**

**Set Rise Time: This value means the device ignores some starting time of the current according amount of rise time, the parameter unit is 10mSec.for example if you set this parameter to 100, 1 Second at the begging of the current will not be effected in the measuring results.**

**Set Fall Time,this parameter is used to eliminate undesired current at the end of current wave form.**

4- **By pressing setting bottom you can go back to measuring page.**
5- **Now the instrument is waiting to pass current and measure it.**

**After measuring you see over all measured values on the screen.to see more details press Enter Key and move thorough results by pressing Arrow Keys.**

**The instrument automatically save any measuring in the internal memory maximum record number is 999.**

## 7.4. Measuring Electrode Force

**BMS210AD can measure both current and force by applying appropriate sensor (Toroid/Load Cell). To measure Electrode force fallow bellow steps:**

1- **Connect load cell probe to the instrument. The instrument automatically changes its measuring mode to"force measuring" mode.**
2- **By pressing setting key, you can go to setting page.**

**At the setting page choose Impact force measuring mode.**

**In impact force there are three parameters, including:**

- ***First Time:*** **means at what exact time instrument will start measuring. This is useful if you want to ignore some undesired impact to the sensor at the beginning of measuring.**
- ***Last Time:*** **means at what exact time instrument will finish measuring force. This is useful if you want to ignore some undesired impact to the sensor at the end of measuring.**
- ***Force Trigger:*** **this parameter determines the force threshold to start measuring.**

**By pressing setting key, you can go back to measurement page. Now instrument is ready for measuring force.**

## 7.5. Measuring Continuous Force

**In setting page, choose force continuous mode.**

**In Continuous force mode, there is only force trigger parameter. Set the value and go back to the Measuring page.**

# 8. History

**Every measuring data and its details are automatically saved in the internal memory. To see the history of results, follow below steps:**

1- Press History key
2- By auto mode detection feature, the history of measuring force or current will be illustrated.
3- By using Arrow keys, record number can be selected.

**As described above, BMS210AD can measure current train of up to 15 pulses. If the selected record is current with pulsation, by pressing Enter key details of each current pulse will be showed.**

# 9. Maintenance

## 9.1 Force turn off:

**If instrument doesn't response to any key or sensor, you have to turn off the instrument. to do that press and hold power key for more than 7 seconds, after this time the instrument will be powered off.**

## 9.2 Replacing the internal battery

**BMS210AD equipped by a rechargeable battery. After a long time the battery storage ability may reduce. In this case, if you prefer to change the battery, please send the instrument to the company. Though, instrument can work without the internal battery by plugging the adaptor,it is recommended to not use the instrument for measuring at this situation.**

# 10. BMS Utility

**BMS210AD interconnects with BMS Utility Ver. 1.1. By this interconnection, it is possible to transfer measuring data to a PC and archive, graph and see more details on the monitor, to clear internal memory, and several more facilities. For more information, please refer BMS_Utility_Ver.1.1.pdf.**

# 11. Calibration

**The instrument regular calibration is required to keep it at acceptable accuracy level.**

**For calibration, it is necessary to send the BMS210AD with its measuring accessories, toroid and/or force sensor to the company.**

**It is recommended to calibrate the instrument annually.**

**For more information about calibration, please contact BAFFCO.**